What is claimed is:

1. A wearable infusion pump assembly comprising:

a reservoir for receiving an infusible fluid;

an external infusion set configured to deliver the infusible fluid to a user; and

a fluid delivery system configured to deliver the infusible fluid from the reservoir to the external infusion set, wherein the fluid delivery system includes:

a volume sensor assembly;

a pump assembly for extracting a quantity of infusible fluid from the reservoir and providing the quantity of infusible fluid to the volume sensor assembly, wherein the volume sensor assembly is configured to determine the volume of at least a portion of the quantity of fluid;

a first valve assembly configured to selectively isolate the pump assembly from the reservoir; and

a second valve assembly configured to selectively isolate the volume sensor assembly from the external infusion set.

2. The wearable infusion pump assembly of claim **1** further comprising:

a disposable housing assembly including the reservoir and a first portion of the fluid delivery system; and

a reusable housing assembly including a second portion of the fluid delivery system.

3. The wearable infusion pump assembly of claim **2** wherein a first portion of the pump assembly is positioned within the disposable housing assembly, and a second portion of the pump assembly is positioned within the reusable housing assembly.

4. The wearable infusion pump assembly of claim **2** wherein a first portion of the first valve assembly is positioned within the disposable housing assembly, and a second portion of the first valve assembly is positioned within the reusable housing assembly.

5. The wearable infusion pump assembly of claim **2** wherein a first portion of the second valve assembly is positioned within the disposable housing assembly, and a second portion of the second valve assembly is positioned within the reusable housing assembly.

6. The wearable infusion pump assembly of claim **1** wherein the external infusion set is a detachable external infusion set configured to releasably engage the fluid delivery system.

7. The wearable infusion pump assembly of claim **1** further comprising:

at least one processor; and

a computer readable medium coupled to the at least one processor, the computer readable medium including a plurality of instructions stored thereon which, when executed by the at least one processor, cause the at least one processor to perform operations comprising:

activating the first valve assembly to isolate the pump assembly from the reservoir; and

activating the pump assembly to provide the quantity of infusible fluid to the volume sensor assembly.

8. The wearable infusion pump assembly of claim **7** wherein the fluid delivery system includes an actuator associated with the first valve assembly and activating the first valve assembly includes energizing the actuator.

9. The wearable infusion pump assembly of claim **8** wherein the actuator includes a shape memory actuator.

10. The wearable infusion pump assembly of claim **7** wherein the fluid delivery system includes an actuator associated with the pump assembly and activating the pump assembly includes energizing the actuator.

11. The wearable infusion pump assembly of claim **10** wherein the fluid delivery system includes a bell crank assembly for mechanically coupling the pump assembly to the actuator.

12. The wearable infusion pump assembly of claim **10** wherein the actuator includes a shape memory actuator.

13. The wearable infusion pump assembly of claim **7** wherein the computer readable medium further includes instructions for:

activating the volume sensor assembly to determine the volume of at least a portion of the quantity of fluid provided to the volume sensor assembly from the pump assembly; and

activating the second valve assembly to fluidly couple the volume sensor assembly to the external infusion set.

14. The wearable infusion pump assembly of claim **13** wherein the fluid delivery system includes an actuator associated with the second valve assembly and activating the second valve assembly includes energizing the actuator.

15. The wearable infusion pump assembly of claim **14** wherein the fluid delivery system includes a bell crank assembly for mechanically coupling the second valve assembly to the actuator.

16. The wearable infusion pump assembly of claim **14** wherein the actuator includes a shape memory actuator.

17. The wearable infusion pump assembly of claim **14** wherein the fluid delivery system further includes:

a bracket assembly configured to maintain the second valve assembly in an activated state.

18. The wearable infusion pump assembly of claim **17** wherein the computer readable medium further includes instructions for:

activating the bracket assembly to release the second valve assembly from the activated state.

19. The wearable infusion pump assembly of claim **18** wherein activating the bracket assembly includes energizing a bracket actuator associated with the bracket assembly.

20. The wearable infusion pump assembly of claim **19** wherein the bracket actuator includes a shape memory actuator.

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